

REMARKS

The above amendments are made in response to the Final Office Action dated April 1, 2008. The Examiner's reconsideration is respectfully requested in view of the above amendment and the following remarks.

Claims 1-9, 13, 14, 18, 22 and 23 have been amended to more clearly define the subject matter of the claimed invention. No new matter has been introduced by these amendments.

Claims 1-26 are pending in the present application.

Claim Rejections Under 35 U.S.C. § 103(a)

Claims 1-26 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Tachibana, et al. (U.S. Patent No. 4,035,563; hereinafter, "Tachibana"), Gloesener, et al. (U.S. Patent No. 5,214,092; hereinafter, "Gloesener"), the product literature of Fujian Sannong Calcium Carbonate Co., on Nano calcium carbonate (1993) (hereinafter, "Fujian"), Mathur, et al. (U.S. Patent No. 4,980,395; hereinafter, "Mathur"), and Detterman (U.S. Patent No. 5,912,277; hereinafter, "Detterman"), in combination thereof.

In response, Applicants have amended Claims 1-9, 13, 14, 18, 22 and 23 to more clearly define the subject matter of the claimed invention. Claims 1, 8, 9 and 18 are independent claims. Claims 2-7, 10-17 and 19-26 are dependent directly or indirectly from Claims 1, 9 and 18 respectively.

In order for an obviousness rejection to be proper, the Examiner must meet the burden of establishing that all elements of the invention are disclosed in the prior art; that the prior art relied upon, coupled with knowledge generally available in the art at the time of the invention, must contain some suggestion or incentive that would have motivated the skilled artisan to modify a reference or combined references; and that the proposed modification of the prior art must have had a reasonable

expectation of success, determined from the vantage point of the skilled artisan at the time the invention was made. *In re Fine*, 5 U.S.P.Q.2d 1596, 1598 (Fed. Cir. 1988); *In re Wilson*, 165 U.S.P.Q. 494, 496 (C.C.P.A. 1970); *Amgen v. Chugai Pharmaceuticals Co.*, 927 U.S.P.Q.2d, 1016, 1023 (Fed. Cir. 1996). See MPEP 2143.

Establishing a prima facie case of obviousness requires that all elements of the invention be disclosed in the prior art. *In re Wilson*, 165 U.S.P.Q. 494, 496 (C.C.P.A. 1970). Further, even assuming that all elements of an invention are disclosed in the prior art, an Examiner cannot establish obviousness by locating references that describe various aspects of a patent applicant's invention without also providing evidence of the motivating force which would have impelled one skilled in the art to do what the patent applicant has done. *Ex parte Levengood*, 28 U.S.P.Q. 1300 (Bd. Pat. App. Int. 1993). The references, when viewed by themselves and not in retrospect, must suggest the invention. *In re Skill*, 187 U.S.P.Q. 481 (C.C.P.A. 1975).

Regarding Claims 1-7

As noted above, Claims 1-7 have been amended to more clearly define the subject matter of the claimed invention. Claim 1 is independent and Claims 2-7 are dependent directly or indirectly from Claim 1.

The amended Claim 1 reads as follows:

A nano calcium carbonate/vinyl chloride monomer dispersion composition comprising:
a vinyl chloride monomer;
nano calcium carbonate; and
a lipophilic dispersing agent, which comprises 1-30 parts by weight of nano calcium carbonate per 100 parts by weight of the vinyl chloride monomer,
wherein the nano calcium carbonate is dispersed in the vinyl chloride and the surface of nano calcium carbonate is modified by being treated with a metal salt of an organic acid; and
wherein the lipophilic dispersing agent has a functional group of phosphoric acid, carboxylic acid or its salt or ester so that it is chemically compatible with the modified surface of the nano calcium carbonate. (Emphasis added)

As above, the claimed invention is drawn to a *nano calcium carbonate/vinyl chloride monomer dispersion composition*, and the claimed composition itself (not by process) includes a *lipophilic dispersing agent with a specific amount*. The lipophilic dispersing agent is further limited to have *a functional group of phosphoric acid, carboxylic acid or its salt or ester*. In the claimed composition, this lipophilic dispersing agent serves as an effective dispersant to disperse the nano calcium carbonate in the vinyl chloride monomer in ultra-fine and uniform fashion, thereby providing for improved impact strength.

However, the cited references, either alone or in combination, do not teach or suggest a *nano calcium carbonate/vinyl chloride monomer dispersion composition* having a *lipophilic dispersing agent with a specific amount*. Regarding the claimed lipophilic dispersing agent, the Examiner has asserted that Tachibana discloses the use of suspension stabilizer as well as initiator, and the use of partially saponified polyvinyl alcohol (or polyvinyl acetate), cellulose, gelatin and tricalcium phosphate (see page 4 of the Action). It is however submitted that the stabilizer (such as saponified polyvinyl alcohol) in Tachibana is used for stabilizing the suspension of organic phase including the vinyl chloride. This stabilizer is used in Applicant's invention for the same purpose. In contrast, the lipophilic dispersing agent included in the claimed composition acts to disperse the nano calcium carbonate into the vinyl chloride monomer uniformly and ultra-finely.

Applicants respectfully submit that none of the cited references, or in combination thereof, does not teach or suggest the *nano calcium carbonate/vinyl chloride monomer dispersion composition* including a *lipophilic dispersing agent with a specific amount* as recited in the amended Claim 1.

Therefore, it is submitted that the cited references, either alone or in combination, fail to teach or suggest the subject matter claimed in amended Claim 1, and thus *no suggestion or motivation* exists in the cited references. Accordingly, *prime facie* obviousness does not exist regarding the

subject matter claimed in Claim 1 with respect to the cited references. Applicants respectfully submit that Claim 1 is now allowable over the cited references. Claims 2-7 are also believed to be allowable, by virtue of their direct or indirect dependency from Claim 1.

Applicants respectfully request the Examiner to withdraw the rejection on Claims 1-7 under 35 U.S.C. § 103.

Regarding Claim 8

As noted above, Claim 8 has been amended to more clearly define the subject matter of the claimed invention.

The amended Claim 8 reads as follows:

A PVC based nanocomposite resin composition prepared by adding the nano calcium carbonate/vinyl chloride monomer dispersion composition of claim 1 into an aqueous solution system comprising deionized water, a suspension stabilizer to prepare a suspension system, and then polymerizing the vinyl chloride monomer in the presence of a polymerization initiator to prepare the PVC based nanocomposite resin composition. (Emphasis added)

As above, the claimed invention is directed to a PVC based nanocomposite resin composition, which is prepared by adding the *nano calcium carbonate/vinyl chloride monomer dispersion composition* as recited in Claim 1.

As discussed above in connection with Claims 1-7, the *nano calcium carbonate/vinyl chloride monomer dispersion composition* as recited in Claim 1 includes a *lipophilic dispersing agent with a specific amount*, which further limited to have *a functional group of phosphoric acid, carboxylic acid or its salt or ester*. Thus, when this dispersion composition of Claim 1 is added into an aqueous system specified in Claim 8, the lipophilic dispersing agent serves as an effective dispersant to disperse the nano calcium carbonate in the vinyl chloride monomer in fine and uniform fashion, thereby enabling to obtain the claimed PVC based nanocomposite resin composition with nano calcium carbonate particles uniformly and ultra-finely dispersed therein and thus providing for improved

impact strength.

More specifically, where the surface of the nano calcium carbonate is modified with fatty acid to wet the vinyl chloride monomer, the lipophilic dispersing agent acts to obtain an ultrafine (sub-micron size) dispersion of nano calcium carbonate particles in vinyl chloride. It is because the lipophilic dispersing agent is a monomer dispersing agent or a polymer dispersing agent having carboxylic acid, phosphoric acid or a salt thereof, so that it is soluble in an organic phase and thus compatible with the modified-surface of the nano calcium carbonate.

Applicants submit that the PVC based nanocomposite resin composition as recited in amended Claim 8 be distinguished from anything prepared by or disclosed in the cited references.

It is therefore respectfully submitted that the subject matter of Claim 8 is not obvious and now allowable over the cited references. Applicant respectfully requests the Examiner to withdraw the rejection on Claim 8 under 35 U.S.C. § 103.

Regarding Claims 9-26

As noted above, Claims 9, 13, 14, 18, 22 and 23 to more clearly define the subject matter of the claimed invention. Claims 9 and 18 are independent claims, and Claims 10-17 and 19-26 are dependent directly or indirectly from Claims 9 and 18 respectively.

The amended Claims 9 and 18 include, inter alia, the following limitation:

adding nano calcium carbonate, a lipophilic dispersing agent and a polymerization initiator to a vinyl chloride monomer to disperse them,

wherein the nano calcium carbonate is dispersed in the vinyl chloride and the surface of nano calcium carbonate is modified by being treated with a metal salt of an organic carboxylic acid, and wherein the lipophilic dispersing agent has a functional group of phosphoric acid, carboxylic acid or its salt or ester so that it is chemically compatible with the modified surface of the nano calcium carbonate (Emphasis added)

As above, the claimed invention involves adding a *lipophilic dispersing agent having a*

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functional group of phosphoric acid, carboxylic acid or its salt or ester so that it is chemically compatible with the modified surface of the nano calcium carbonate.

Thus, the discussions presented above in connection with Claims 1-7 and Claim 8 apply to the amended Claims 9 and 18 in a similar manner.

Therefore, it is submitted that the cited references, either alone or in combination, fails teach or suggest the subject matter claimed in amended Claims 9 and 18, and thus *no suggestion or motivation* exists in the cited references. Accordingly, *prime facie* obviousness does not exist regarding the subject matter claimed in Claims 9 and 18 with respect to the cited references. Applicants respectfully submit that Claims 9 and 18 are now allowable over the cited references. Claims 10-17 and 19-26 are also believed to be allowable, by virtue of their direct or indirect dependency from Claims 9 and 18 respectively.

Applicant respectfully requests the Examiner to withdraw the rejection on Claims 9-26 under 35 U.S.C. § 103.

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Conclusion

In view of the foregoing, it is respectfully submitted that the instant application is in condition for allowance. Reconsideration and subsequent allowance of this application are courteously requested.

If there are any charges due with respect to this Amendment or otherwise, please charge them to Deposit Account No. 06-1130 maintained by Applicant's attorneys.

The Examiner is invited to contact Applicant's Attorneys at the below-listed telephone number with any questions or comments regarding this Response or otherwise concerning the present application.

Respectfully submitted,

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